RESEARCH ARTICLE

CHARACTERIZATION AND PRELIMINARY EVALUATION OF DIFFERENT GENOTYPES OF LEAFY VEGETABLE CHENCH (*CORCHOROUS ACUTANGULUS* LAM.)

Bhupendra Singh Rana*, Pravin Kumar Sharma, Amit Dixit and Kamal Kumar

Department of Vegetable science, College of Agriculture,
Indira Gandhi Krishi Vishwavidyalya Raipur -492006, India
Email: bsrana305@gmail.com

Received-12.06.2017, Revised-24.06.2017

Abstract: The study was carried out to characterization and evaluation of Forty-six indigenous genotypes of Chench (Corchorus acutangulus Lam.) where collected from different place of Raigarh, Kanker, Bastar, Narayanpur and kondagaon district of Chhattisgarh during 2015 at Indira Gandhi Krishi Vishwavidyalaya Raipur, which was planted with three replication in RCBD design for qualitative and quantitative characters. Among forty-six genotypes IGCB-2013-23 found higher yield (55.42q/ha) followed by IGCB-2015-9 (53.58q/ha). IGCB-2013-23 recorded highest leaf weight (5.13g) while maximum stem weight was observed in IGCB-2015-8 (6.60 g) were maximum leaf width and leaf length was recorded in IGCB-2013-23 (5.47cm) IGCB-2013-23 (8.39cm) respectively. Among the qualitative characters, all the genotypes were erect, had a tap root. Other morphological characters exhibited large variability.

Keyword: Chench, Genotypes, Characterization, Preliminary evaluation, Qualitative, Quantitative characters

INTRODUCTION

Chench (*Corchorus acutangulus* Lam.) is one of the unexploited and underutilized leafy vegetable and also know as vegetable jute in India. Chenh is one of the main species of taxonomically diverse group of leaf vegetables. The nutritional value of chench is excellent because of its high content of essential minerals (iron, calcium) and good source of vitamins (vitamin C and folic acid). Chench belongs to the genus Corchorous of the family Tiliaceae. *Corchorous* has many species which are used as leafy vegetables, Many wild species occurs out of which, only seven species are cultivated *C. fascicularis, C. trilocularis, C. acutangulus, C. tridens, C. capsularis, C. olitorius, C. depresses* (Choudhary *et al*., 2013). It is widely cultivated throughout India especially during the summer and rainy seasons. There was little information on the extent and kind of diversity present in the collection maintained in Chhattisgarh, hence characterization and preliminary evaluation of these genotypes was considered an important area of study.

MATERIAL AND METHOD

Forty-six genotypes were collected at Agriculture Research Station, IGKV, Krishak Nagar, Raipur were characterized and evaluated during the *rabi* season of 2015-16 at Research and Instructional Farm, Department of Horticulture of, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.). Each genotype was grown in 2 m long rows with a spacing of 50 cm between rows and 30 cm within rows, under recommended growing conditions. For characterization, IBPGR descriptor (7 qualitative and 12 quantitative traits) were considered. Qualitative traits studied includes growth habit, branching index, stem pigmentation, leaf pigmentation, leaf shape, Leaf vein pigmentation, prominence of leaf veins, petiole pigmentation, while quantitative traits recorded were plant height, number of branches, leaf length, leaf breadth, leaf weight, stem weight and leaf yield. The scoring for these characters was done as per the IBPGR Amaranth Descriptor List (Grubben and van Sloten 1981). Data were collected from five randomly selected plants on various quantitative characters. Mean data were subjected to statistical analysis to calculate range, standard deviation and coefficient of variability which were used to group the genotypes into different categories (Panse and Sukhatme, 1978).

RESULT AND DISCUSSION

With respect to the quantitative traits, the genotypes showed a wide range of variability in plant height (21.23–42.82cm), number of branches(2.57-14.90), Number of leaves per plant (10.67-18.23), Internodal length (1.07-1.67cm), Petiole length (1.33-5.70cm), leaf length (3.72-8.39cm), leaf width (1.38–5.47cm), leaf weight per plant (0.77- 5.13g), stem weight per plant (1.80-6.60g), Days to 50% flowering (43.33 to 67.00), Dry matter percentage of plant (11.48-40.73 %) and leaf yield q/ha (27.08-55.42q/ha) indicating the possibility of exploiting this variation for varietal improvement in chench. Similarly, Wu *et al*. (2000) reported the presence of wide diversity in agronomic traits among amaranth genotypes and also identified several genotypes having the required agronomic traits for cultivar development.

Among the qualitative characters, all the genotypes were erect, had a tap root. Other morphological

*Corresponding Author

characters exhibited large variability (Table 1). Branches were found all along the stem in almost all the genotypes (28) while some branches were confined to the top (18). Stem pigmentation ranged from dark red (27) to medium red (1) to light red (10) to light green (4) to greenish red (1) and dark green (3). Leaf pigmentation ranged from dark

Table 1. Grouping of chench genotypes for qualitative parameters

Character	Category
Branching Index	(a) Branches all over the stem (28), (b)Only at top(18)
Stem pigmentation	(a) Dark red(27), (b) Medium red(1), (c) Light red(10), (d) Light green(4), (e) Greenish red(1), (d) Dark green(3)
Leaf pigmentation	(a) dark green (20), (b) Medium green (8), (c) Red green (1) (d) Light reddish green (14), (e) Light green (3)
Leaf shape	(a) Lanceolate (22), (b) Ovate lanceolate (24)
Leaf vein pigmentation	(a) Green(7), (b) Pink (39)
Prominence of leaf veins	(a) Smooth (46)
Petiole pigmentation	(a) Light reddish green(2), (b) Light red(29), (c) Medium red(7), (d) Light green(7) (e) Dark red(1)

Table 2. Promising chench entries identified for different biometric traits

Character	Range	Genotypes
Plant height	>35cm	IGCB-2015-2, IGCB-2015-7, IGCB-2015-8, IGCB-2015-10, IGCB-2015-12, IGCB-2015-13, IGCB-2015-14, IGCB-2015-15, IGCB-2015-16, IGCB-2015-17, IGCB-2015-18
Number of Branches	>10	IGCB-2013-11, IGCB-2015-1, IGCB-2015-2, IGCB-2015-3, IGCB-2015-4, IGCB-2015-5, IGCB-2015-6, IGCB-2015-7, IGCB-2015-8, IGCB-2015-9, IGCB-2015-11, IGCB-2015-12, IGCB-2015-13, IGCB-2015-14, IGCB-2015-15, IGCB-2015-18, IGCB-2015-19, IGCB-2015-20, IGCB-2015-21
Number of leaves per plant	>17	IGCB-2015-13, IGCB-2015-15, IGCB-2015-14, IGCB-2015-9, IGCB-2015-8, IGCB-2015-5, IGCB-2013-19, IGCB-2015-11, IGCB-2015-12
Internodal length (cm)	>1.5cm	IGCB-2015-1, IGCB-2015-12, IGCB-2015-10, IGCB-2015-8, IGCB-2015-15, IGCB-2015-14, IGCB-2015-7
Petiole length (cm)	>5cm	IGCB-2015-8
Leaf length	>7cm	IGCB-2015-8, IGCB-2015-10, IGCB-2015-12, IGCB-2015-14
Leaf breadth	>3cm	IGCB-2015-8, IGCB-2015-10, IGCB-2015-11, IGCB-2015-12, IGCB-2015-14
Leaf weight per plant	>4g	IGCB-2015-8, IGCB-2015-10, IGCB-2015-14
Stem weight per plant	>5g	IGCB-2013-21, IGCB-2013-22, IGCB-2015-2, IGCB-2015-3, IGCB-2015-4, IGCB-2015-5, IGCB-2015-8, IGCB-2015-9, IGCB-2015-10, IGCB-2015-12, IGCB-2015-15, IGCB-2015-16
Days to 50% flowering	<50 days	IGCB-2013-23, IGCB-2013-25, ICGB-2015-10, IGCB-2015-11
Dry matter percentage of plant	>25 %	IGCB-2013-9, IGCB-2015-6, IGCB-2015-12, IGCB-2013-6, IGCB-2013-14, IGCB-2013-19, IGCB-2013-7, IGCB-2013-28, IGCB-2013-20, IGCB-2013-16, IGCB-2013-15, IGCB-2015-1, IGCB-2013-11, IGCB-2015-13, IGCB-2013-18 and IGCB-2013-21
Leaf yield q/ha	>50q/ha	IGCB-2013-15, IGCB-2015-2, IGCB-2015-8, IGCB-2015-14, IGCB-2015-9, IGCB-2015-10

Table 3. Mean performance of Genotypes

Genotype	Plant height	Number of Branches	Number of leaves per plant	Internodal length (cm)	Petiole length (cm)	Leaf length	Leaf breadth	Leaf weight per plant	Stem weight per plant	Days to 50% flowering	Dry matter percentage of plant	Leaf yield q/ha
IGCB-2013-1	29.69	3.73	12.27	1.08	1.65	3.82	1.65	2.96	1.87	57.33	16.00	43.75
IGCB-2013-2	31.16	2.57	10.67	1.07	1.57	4.34	1.69	2.61	1.80	62.67	12.58	27.58
IGCB-2013-3	30.75	2.93	12.20	1.16	1.33	3.72	1.38	3.29	2.64	55.33	16.86	35.92
IGCB-2013-4	29.92	3.37	11.60	1.24	1.64	4.03	1.64	1.96	1.89	62.33	15.77	40.92
IGCB-2013-5	21.23	3.27	14.20	1.26	2.14	4.93	2.08	3.74	2.70	60.00	21.60	27.08
IGCB-2013-6	24.02	3.70	12.33	1.21	2.45	5.76	2.22	3.27	1.81	63.67	32.59	29.25
IGCB-2013-7	26.94	5.27	14.70	1.13	1.93	4.62	1.95	2.90	2.49	59.67	28.23	39.75
IGCB-2013-8	27.98	2.67	12.93	1.33	2.31	4.62	2.31	4.78	3.41	56.67	24.63	34.42
IGCB-	31.93	3.67	13.43	1.27	2.43	5.36	2.20	3.72	2.82	61.67	40.73	29.25

2013-9												
IGCB-2013-10	37.75	8.33	15.50	1.33	2.10	5.26	2.12	6.02	4.30	62.33	21.54	32.25
IGCB-2013-11	30.76	12.90	15.93	1.41	2.26	5.83	2.30	6.00	3.51	67.00	25.55	31.25
IGCB-2013-12	30.93	6.23	13.97	1.27	2.19	5.32	2.11	4.06	2.21	56.67	23.50	33.25
IGCB-2013-13	30.36	3.90	13.43	1.24	2.06	5.01	1.94	4.00	2.75	65.00	23.96	28.25
IGCB-2013-14	28.32	3.20	12.13	1.30	1.72	4.91	1.64	5.23	3.17	66.67	28.39	37.75
IGCB-2013-15	28.60	5.40	13.27	1.36	2.27	5.42	2.24	8.26	4.35	64.33	26.18	52.08
IGCB-2013-16	31.00	5.23	14.47	1.18	1.90	5.11	1.87	4.23	3.14	63.33	26.56	42.08
IGCB-2013-17	31.73	9.77	15.03	1.29	2.20	5.78	2.15	6.31	4.59	63.33	23.39	35.25
IGCB-2013-18	30.53	8.37	16.67	1.18	3.13	6.37	2.73	8.23	4.85	63.33	25.24	40.58
IGCB-2013-19	31.20	9.93	17.40	1.43	2.35	5.60	2.24	6.36	4.44	55.67	28.37	41.08
IGCB-2013-20	32.49	8.00	15.83	1.32	2.49	4.89	2.47	6.20	4.66	62.67	26.63	34.42
IGCB-2013-21	30.17	8.07	14.27	1.40	2.46	5.71	2.52	8.62	5.71	57.67	25.11	45.75
IGCB-2013-22	30.15	6.77	13.40	1.33	2.40	5.54	2.40	7.76	5.57	60.00	17.18	42.42
IGCB-2013-23	40.59	6.30	15.70	1.31	5.70	8.39	5.47	7.07	4.28	48.67	14.38	55.42
IGCB-2013-24	29.77	5.97	15.80	1.24	2.55	5.77	2.30	7.93	4.16	62.67	11.84	32.75
IGCB-2013-25	29.12	6.10	14.57	1.27	2.53	5.43	2.53	5.79	4.24	43.33	15.72	32.75
IGCB-2015-1	27.96	11.27	15.63	1.67	2.20	5.73	2.18	7.01	4.90	57.33	26.07	35.58
IGCB-2015-2	39.85	10.37	16.07	1.41	2.83	6.03	2.73	8.34	5.26	63.67	17.12	50.33
IGCB-2015-3	33.98	11.37	15.30	1.24	2.51	5.02	2.51	6.00	5.24	57.67	28.16	34.08
IGCB-2015-4	24.48	10.63	16.07	1.24	2.68	4.51	2.74	5.95	5.08	60.00	19.93	42.08
IGCB-2015-5	26.35	11.60	17.53	1.32	2.44	4.58	2.39	6.18	5.03	54.67	17.19	44.42
IGCB-2015-6	32.88	11.23	15.50	1.13	1.74	5.11	1.82	4.32	4.01	65.67	33.18	29.58
IGCB-2015-7	35.25	11.33	15.63	1.51	2.05	5.66	2.06	5.98	4.27	58.67	24.56	32.08
IGCB-2015-8	42.82	13.00	17.67	1.56	2.40	5.13	3.28	10.96	6.60	57.67	18.46	51.58
IGCB-2015-9	34.60	14.90	17.70	1.45	2.82	6.84	2.84	11.61	6.52	62.33	18.94	53.58
IGCB-2015-10	35.65	9.80	15.93	1.61	3.12	7.11	3.06	12.37	6.29	44.00	19.38	44.75
IGCB-2015-11	30.07	12.57	17.03	1.44	3.13	6.05	3.22	6.78	4.91	45.33	21.14	42.58
IGCB-2015-12	37.41	12.97	17.13	1.65	3.17	7.06	3.26	7.49	5.54	56.67	32.80	34.75
IGCB-2015-13	35.45	13.47	18.23	1.44	2.99	6.31	2.99	6.12	2.96	63.67	25.54	32.75
IGCB-2015-14	41.59	14.00	17.80	1.54	3.15	7.31	3.24	10.86	4.41	64.33	19.54	52.58
IGCB-2015-15	37.46	13.07	18.03	1.56	2.45	6.51	2.46	7.68	5.53	62.67	14.72	36.25
IGCB-2015-16	37.86	8.47	15.87	1.31	2.47	5.55	2.47	8.14	5.21	59.00	16.58	39.25
IGCB-2015-17	36.52	9.43	15.87	1.35	2.36	5.34	2.32	7.80	3.74	62.33	19.51	37.25
IGCB-2015-18	36.22	11.73	16.57	1.42	2.58	5.86	2.65	10.87	3.78	61.67	16.47	41.92
IGCB-2015-19	34.33	10.57	16.10	1.24	2.58	4.91	2.42	7.45	3.78	57.00	15.26	41.08
IGCB-2015-20	33.07	10.93	15.63	1.33	2.54	5.65	2.53	8.08	3.86	62.00	19.01	34.75
IGCB-2015-21	31.85	10.97	16.30	1.34	2.85	5.14	2.72	7.14	4.70	59.33	19.36	39.42

green (20), light reddish green (14) to medium green (8) to light green (3) and reddish green (1). Leaf shape ranged from lanceolate (22) to ovate lanceolate (24). Wu-Huai Xiang *et al*. (2000) observed wide diversity for stem and leaf colour while evaluating the genetic resource collection from China. Xiao *et al*. (2000) classified 31 vegetable amaranth varieties based on 17 biological characters, of which leaf shape and colour were considered more practical for classifying amaranth varieties. Leaf veins pigmentation were found green (7), to pink (39). Leaf vein prominent in all the genotypes it was smooth (46) and the petiole pigmentation ranged from light red (29), medium red (7) to light green (7)

and dark red (1). Kurrey (2015) observed wide range of variability in 25 genotypes of chench for plant height, leaf length, leaf width, number of branches per plant, leaf yield kg per plot, leaf yield q per ha.

CONCLUSION

Promising entries identified for different important biometric traits are given in Table 2. These include lines with maximum plant height, leaf length, breadth, leaf and stem weight. IGCB-2015-10 recorded highest leaf weight (5.13g) followed by IGCB-2015-14 (4.59 g) while maximum stem weight was observed in IGCB-2015-8 (6.60 g) followed by IGCB-2015-9 (6.52g), were maximum leaf width and leaf length was recorded in IGCB-2015-8 (5.47cm) followed by IGCB-2015-12 (3.26cm) and IGCB-2015-8 (8.39cm) followed by IGCB-2015-14 (7.31cm) respectively which is a desirable character in leafy vegetables. The variability present in the stem, leaf and branch characters and in some quantitative characters such as plant height, leaf number and days to flowering can be successfully utilized for commercial exploitation of chench. These lines can either be directly used for commercial cultivation or can be utilized for multi locational trials in different location or also can utilized in intervarietal hybridization to obtain segregating population.

ACKNOWLEDGEMENT

I am heartily thankful to Dr. Pravin Kumar Sharma and Deepika Chandravanshi my family and friends for their suggestion & support in search of literature and in compiling this paper. The authors are also grateful to publishers/ authors/editors of all those books, articles and journals from where the literature for this article has been reviewed and discussed.

REFERENCES

Choudhary, S.B., Sharma, H.K., Karmakar, P.G., Kumar, A.A., Saha, A.R., Hazra, P. and Mahapatra, B.S. (2013). Nutritional profile of cultivated and wild jute (Corchorus species) AJCS **7**(13):1973-1982.

Grubben GJH, van Sloten DH. (1981). Genetic resources of amaranths, IBPGR, Rome, Italy.

Joshi, V., Vijaya, M., Sireesha, K. and Latha, P. M. (2011). Characterization and preliminary evaluation of Vegetable amaranth (Amaranthus spp.). Veg. Sci., **38**(2): 239-240.

Kurrey, V. K. (2015). Collection, evaluation and identification of suitable genotypes of chench (*Corchorus acutangulus* Lam.) for Chhattisgarh plain condition. M. Sc.(Ag) Thesis IGKV, Raipur

Panse, V.G. and Sukhatme, V.G. (1989). Statistical methods for agricultural workers. ICAR, New Delhi.

Wu HX, Sun M, Yue SX, Sun HL, Cai YZ, Huang RH, Brenner D, Corke H. (2000). Field evaluation of an *Amaranthus* genetic resource collection in China. Genetic Resources and Crop Evolution **47**(1):43–53.

Xiao SG, Liu ZM, Song Y, Yang G; Xiao SG, Liu ZM, Song, Yang G. (2000). Classification of vegetable amaranth variety resources. Journal of Hunan Agricultural University. **26**(4):274–277.